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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,935	09/29/2003	Fred Gehrung Gustavson	YOR920030330US1	8289

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EXAMINER
DO, CHAT C

ART UNIT	PAPER NUMBER
2193	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/671,935	GUSTAVSON ET AL.
	Examiner	Art Unit	
	Chat C. Do	2193	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>9/29/03; 12/30/03; 9/11/06; 11/21/06; 3/30/7</u>.

2a)☐ This action is FINAL.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>30 December 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>See Continuation Sheet</u>.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :12/30/3;9/11/6;11/21/6;2/27/7;3/30/7.

DETAILED ACTION

Specification

1.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2.   The abstract of the disclosure is objected to because it is written less than 50 words in length. Correction is required. See MPEP § 608.01(b).

3.   The disclosure is objected to because of the following informalities:

The applicant is advised to update information cited under the "Cross-Reference to Related Applications" section in pages 1-3 of the disclosure.

Appropriate correction is required.

Claim Objections

4.   Claims 4, 10, and 16 are objected to because of the following informalities:

Re claim 4, the applicant is advised to rewrite the acronym "BLAS" in full for clarification.

Re claims 10 and 16, they have the same objection as cited in claim 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6.   Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

        Re claim 1, it is an incomplete claim since the claim has only a selecting step for selecting a matrix which cannot be a method of executing linear algebra as intended in the preamble. Claims 7, 13, and 19 have the same rejection.

        Thus, claims 2-6, 8-12, 14-18, and 20 are also rejected for being dependent on the rejected base claims 1, 7, 13, and 19.

Claim Rejections - 35 USC § 101

7.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8.   Claims 1-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

        Claims 1-20 cite a method, apparatus, and medium for executing a linear algebra subroutine in computer in accordance with a mathematical algorithm. In order for claims to be statutory, claims must either include a practical/physical application or a concrete,

useful, and tangible result. However, claims 1-20 merely disclose steps/components for

executing a linear algebra subroutine without further disclosing a practical/physical

application or a useful and tangible result. In addition, claims 13-18 as program software

resides on non-tangible medium as clearly stated in page 24 lines 10-15. Therefore,

claims 1-20 are directed to non-statutory subject matter.

Claim Rejections - 35 USC § 102

9.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10.   Claims 1-2, 5-8, 11-14, and 17-18 are rejected under 35 U.S.C. 102(b) as being

anticipated by Myszewski (U.S. 5,099,447).

Re claim 1, Myszewski discloses in Figure 5 a method of executing a linear

algebra subroutine on a computer (e.g. abstract, col. 1 lines 18-46, col. 2 lines 59-64, and

col. 3 lines 1-10), method comprising: selecting a matrix subroutine from among a

plurality of matrix subroutines that performs a matrix multiplication (e.g. col. 4 lines 55-

64, col. 14 lines 34-55, cols. 15-18 wherein a submatrix or block of matrix is selected and

stream down to a cache for processing in order to prevent overflow cache).

Re claim 2, Myszewski further discloses in Figure 5 computer includes an L1

cache (e.g. abstract or col. 3 lines 1-11 as highest cache in memory hierarchy), method

further comprising: determining a size of each of matrices involved in matrix

multiplication; and selecting one of matrices to reside in an L1 cache, based on determined size, wherein selecting a matrix subroutine comprises determining which of matrix subroutines is consistent with matrix selected to reside in L1 cache (e.g. cols. 15-18 and col. 4 lines 55-64).

Re claim 5, Myszewski further discloses in Figure 5 selecting a matrix subroutine comprises an aspect of a generalized matrix streaming process in which matrix data is stored in multiple levels of computer memory (e.g. from main memory to local cache of processor) and matrix data is systematically streamed into matrix multiplication (e.g. abstract).

Re claim 6, Myszewski further discloses in Figure 5 plurality of matrix subroutines comprises six possible matrix subroutines (e.g. cols. 15-16 wherein the number of block for each processor is equate to six).

Re claim 7, it is an apparatus claim of claim 1. Thus, claim 7 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 8, it is an apparatus claim of claim 2. Thus, claim 8 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 11, it is an apparatus claim of claim 5. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 12, it is an apparatus claim of claim 6. Thus, claim 12 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 13, it is a medium claim of claim 1. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 14, it is a medium claim of claim 2. Thus, claim 14 is also rejected under

the same rationale as cited in the rejection of rejected claim 2.

Re claim 17, it is a medium claim of claim 5. Thus, claim 17 is also rejected under

the same rationale as cited in the rejection of rejected claim 5.

Re claim 18, it is a medium claim of claim 6. Thus, claim 18 is also rejected under

the same rationale as cited in the rejection of rejected claim 6.

Claim Rejections - 35 USC § 103

11.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

12.   Claims 3-4, 9-10, and 15-16 are rejected under 35 U.S.C. 103(a) as being obvious over

Myszewski (U.S. 5,099,447) in view of Keenan et al. (U.S. 6,675,106).

Re claims 3-4, Myszewski fails to disclose in Figure 5 matrix subroutine

comprises a subroutine from a LAPACK (Linear Algebra PACKage) and the LAPACK

subroutine comprises a BLAS Level 3 L1 cache kernel. However, Keenan et al. disclose

matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage)

and the LAPACK subroutine comprises a BLAS Level 3 L1 cache kernel (e.g. col. 6 line

52 – col. 7 line 40). Therefore, it would have been obvious to a person having ordinary

skill in the art at the time the invention is made to add matrix subroutine comprises a

subroutine from a LAPACK (Linear Algebra PACKage) and the LAPACK subroutine

comprises a BLAS Level 3 L1 cache kernel as seen in Keenan et al.'s invention into

Myszewski's invention because it would enable to highly efficient and optimize in

solving system of linear equations in computer (e.g. col. 7 lines 1-40).

Re claim 9, it is an apparatus claim of claim 3. Thus, claim 9 is also rejected

under the same rationale as cited in the rejection of rejected claim 3.

Re claim 10, it is an apparatus claim of claim 4. Thus, claim 10 is also rejected

under the same rationale as cited in the rejection of rejected claim 4.

Re claim 15, it is a medium claim of claim 3. Thus, claim 15 is also rejected under

the same rationale as cited in the rejection of rejected claim 3.

Re claim 16, it is a medium claim of claim 4. Thus, claim 16 is also rejected under

the same rationale as cited in the rejection of rejected claim 4.

13.   Claim 19 is rejected under 35 U.S.C. 103(a) as being obvious over Myszewski (U.S.

5,099,447) in view of Philip et al. ("PLAPACK: Parallel Linear Algebra Package Design

Overview").

Re claim 19, Myszewski further discloses in Figure 5 a method of providing a

service involving at least one of solving and applying a scientific/engineering problem

(e.g. abstract and col. 1 lines 18-45), method comprising at least one of: using a linear

algebra software package (e.g. col. 1 lines 20-40) that performs one or more matrix

processing operations (e.g. Figure 5), wherein linear algebra software package selects a

matrix subroutine from among a plurality of matrix subroutines that performs a matrix

multiplication (e.g. cols. 15-18); providing a consultation for solving a scientific or

engineering problem using linear algebra software package (e.g. col. 3 lines 1-42).

Myszewski fails to disclose transmitting a result of linear algebra software package on at

least one of a network, a signal-bearing medium containing machine-readable data

representing result, and a printed version representing result; and receiving a result of

linear algebra software package on at least one of a network, a signal-bearing medium

containing machine-readable data representing result, and a printed version representing

result. However, Philip et al. disclose a step of transmitting a result of linear algebra

software package on at least one of a network, a signal-bearing medium containing

machine-readable data representing result, and a printed version representing result; and

receiving a result of linear algebra software package on at least one of a network, a

signal-bearing medium containing machine-readable data representing result, and a

printed version representing result (e.g. abstract and page 1 under the introduction section

wherein the library is distributed to network processors for processing). Therefore, it

would have been obvious to a person having ordinary skill in the art at the time the

invention is made to add a step of transmitting a result of linear algebra software package

on at least one of a network, a signal-bearing medium containing machine-readable data

representing result, and a printed version representing result; and receiving a result of

linear algebra software package on at least one of a network, a signal-bearing medium

containing machine-readable data representing result, and a printed version representing

result as seen in Philip et al.' invention into Myszewski's invention because it would

enable high performance parallel computing (e.g. page 1 under introduction section).

14.   Claim 20 is rejected under 35 U.S.C. 103(a) as being obvious over Myszewski (U.S.

5,099,447) in view of Philip et al. ("PLAPACK: Parallel Linear Algebra Package Design

Overview"), as applied to claim 19, and in further view of Keenan et al. (U.S. 6,675,106).

Re claim 20, Myszewski in view of Philip et al. fail to disclose in Figure 5 matrix

subroutine comprises a BLAS level 3 L1 cache kernel from a LAPACK. However,

Keenan et al. disclose matrix subroutine comprises a BLAS level 3 L1 cache kernel from

a LAPACK (e.g. col. 6 line 52 – col. 7 line 40). Therefore, it would have been obvious to

a person having ordinary skill in the art at the time the invention is made to add matrix

subroutine comprises a BLAS level 3 L1 cache kernel from a LAPACK as seen in

Keenan et al.'s invention into Myszewski in view of Philip et al.'s invention because it

would enable to highly efficient and optimize in solving system of linear equations in

computer (e.g. col. 7 lines 1-40).

Double Patenting

15.   The nonstatutory double patenting rejection is based on a judicially created doctrine
grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or
improper timewise extension of the "right to exclude" granted by a patent and to prevent possible
harassment by multiple assignees.   A nonstatutory obviousness-type double patenting rejection
is appropriate where the conflicting claims are not identical, but at least one examined
application claim is not patentably distinct from the reference claim(s) because the examined
application claim is either anticipated by, or would have been obvious over, the reference
claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re
Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225
USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re
Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163
USPQ 644 (CCPA 1969).
A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may
be used to overcome an actual or provisional rejection based on a nonstatutory double patenting
ground provided the conflicting application or patent either is shown to be commonly owned

with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4-5, 7-17, and 19-20 of copending Application No. 10/671,934. Although the conflicting claims are not identical, they are not patentably distinct from each other because

Claims 1, 4-5, 7-17, and 19-20 of application No. 10/671,934 contain every element of claims 1-20 of the instant application and thus anticipate the claims of the instant application. Claims of the instant application therefore are not patently distinct from the earlier patent claims and as such are unpatentable over obvious-type double patenting. A later application claim is not patentably distinct from an earlier claim if the later claim is anticipated by the earlier claim.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

"A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896, 225 USPQ at 651 (affirming a holding of obviousness type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness-type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARB LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

"Claim 12 and Claim 13 are generic to the species of invention covered by claim 3 of the patent. Thus, the generic invention is "anticipated" by the species of the patented invention. Cf., Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (holding that an earlier species disclosure in the prior art defeats any generic claim) 4 . This court's predecessor has held that, without a terminal disclaimer, the species claims preclude issuance of the generic application. In re Van Ornum, 686 F.2d 937, 944, 214 USPQ 761, 767 (CCPA 1982); Schneller, 397 F.2d at 354. Accordingly, absent a terminal disclaimer, claims 12 and 13 were properly rejected under the doctrine of obviousness type double patenting." (In re Goodman (CA FC) 29 USPQ2d 2010 (12/3/1993).

Conclusion

16.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

a.   U.S. Patent No. 5,944,819 to Kumar et al. disclose a method and system to

optimize software execution by a computer using hardware attributes of the computer.

b.   U.S. Patent No. 6,675,106 to Keenan et al. disclose a method of multivariate

spectral analysis.

c.   U.S. Patent No. 6,357,041 to Pingali et al. disclose a data-centric multi-level

blocking.

d.   U.S. Patent No. 5,825,677 to Agarwal et al. disclose a numerically intensive

computer accelerator.

e.   U.S. Patent No. 5,513,366 to Agarwal et al. disclose a method and system for

dynamically reconfiguring a register file in a vector processor.

f.   U.S. Patent Publication No. 2004/0148324 to Garg discloses a block-partitioned

technique for solving a system of linear equations represented by a matrix with static and

dynamic entries.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The

examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2193

April 11, 2007